Complete Summary

GUIDELINE TITLE

Pelvic inflammatory disease. Sexually transmitted diseases treatment guidelines 2006.

BIBLIOGRAPHIC SOURCE(S)

Centers for Disease Control and Prevention, Workowski KA, Berman SM. Pelvic inflammatory disease. Sexually transmitted diseases treatment guidelines 2006 [published errata appear in MMWR Morb Mortal Wkly Rep 2006 Sep 15;55(36):997]. MMWR Morb Mortal Wkly Rep 2006 Aug 4;55(RR-11):56-61. [222 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Centers for Disease Control and Prevention. Pelvic inflammatory disease. Sexually transmitted diseases treatment guidelines. MMWR Recomm Rep 2002 May 10;51(RR-6):48-52.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse (NGC): This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- July 08, 2008, Fluoroquinolones (ciprofloxacin, norfloxacin, ofloxacin, levofloxacin, moxifloxacin, gemifloxacin): A BOXED WARNING and Medication Guide are to be added to the prescribing information to strengthen existing warnings about the increased risk of developing tendinitis and tendon rupture in patients taking fluoroquinolones for systemic use.
- September 11, 2007, Rocephin (ceftriaxone sodium): Roche informed healthcare professionals about revisions made to the prescribing information for Rocephin to clarify the potential risk associated with concomitant use of Rocephin with calcium or calcium-containing solutions or products.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Pelvic inflammatory disease (PID) including any combination of the following:

- Endometritis
- Salpingitis
- Tubo-ovarian abscess
- Pelvic peritonitis

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Prevention
Treatment

CLINICAL SPECIALTY

Family Practice
Infectious Diseases
Internal Medicine
Obstetrics and Gynecology
Preventive Medicine

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Health Care Providers
Managed Care Organizations
Nurses
Physician Assistants
Physicians
Public Health Departments

GUIDELINE OBJECTIVE(S)

- To update the Sexually Transmitted Diseases Treatment Guidelines 2002 (*MMWR 2002;51[No. RR-6]*)

- To assist physicians and other health-care providers in preventing and treating sexually transmitted diseases (STDs)

TARGET POPULATION

Women with suspected or confirmed pelvic inflammatory disease (PID)

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Laparoscopy
2. Evaluation of signs and symptoms of pelvic inflammatory disease (PID) according to defined criteria:
    - Uterine, adnexal, or cervical motion tenderness
    - Oral temperature >101 degrees F(>38.3 degrees C)
    - Abnormal cervical or vaginal mucopurulent discharge
    - Presence of abundant numbers of white blood cells on saline microscopy of vaginal secretions
    - Elevated erythrocyte sedimentation rate
    - Elevated C-reactive protein
    - Laboratory documentation of cervical infection with *Neisseria gonorrhoeae* or *Chlamydia trachomatis*
    - Histopathological evidence of endometritis on endometrial biopsy
    - Transvaginal sonography or magnetic resonance imaging techniques showing thickened, fluid-filled tubes with or without free pelvic fluid or tubo-ovarian complex, or Doppler studies suggesting pelvic infection (e.g., tubal hyperemia)
    - Laparoscopic abnormalities consistent with PID

Treatment/Management

1. Hospitalization at the discretion of the health-care provider
2. Parenteral regimens:
    - Cefotetan
    - Cefoxitin plus doxycycline
    - Clindamycin or metronidazole in addition to doxycycline
    - Clindamycin plus gentamicin
    - Ofloxacin or levofloxacin with or without metronidazole
    - Ampicillin/sulbactam plus doxycycline
3. Oral treatment regimens
    - Ofloxacin or levofloxacin with or without metronidazole
    - Ceftriaxone plus doxycycline with or without metronidazole
    - Third-generation cephalosporin (e.g. ceftizoxime or cefotaxime) plus doxycycline with or without metronidazole
4. Alternative treatment regimens
    - Amoxicillin/clavulanic acid plus doxycycline
    - Azithromycin
5. Patient follow-up
6. Evaluation and treatment of sex partners
7. Preventive screening for chlamydial infection in high-risk women
8. Special considerations in pregnancy: hospitalization and parenteral antibiotics

9. Special considerations in HIV infection
10. Special considerations for women with intrauterine devices

MAJOR OUTCOMES CONSIDERED

- Microbiologic cure
- Alleviation of signs and symptoms
- Prevention of sequelae
- Prevention of transmission

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Subjective Review

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Beginning in 2004, Centers for Disease Control and Prevention (CDC) personnel and professionals knowledgeable in the field of sexually transmitted diseases (STDs) systematically reviewed evidence (including published abstracts and peer-reviewed journal articles) concerning each of the major STDs, focusing on information that had become available since publication of the *Sexually Transmitted Diseases Treatment Guidelines, 2002*. Background papers were written and tables of evidence constructed summarizing the type of study (e.g., randomized controlled trial or case series), study population and setting, treatments or other interventions, outcome measures assessed, reported findings, and weaknesses and biases in study design and analysis. A draft document was developed on the basis of the reviews.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Consensus Development Conference)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

In April 2005, the Centers for Disease Control and Prevention (CDC) staff members and invited consultants assembled in Atlanta, Georgia, for a 3-day meeting to present the key questions regarding sexually transmitted disease (STD) treatment that emerged from the evidence-based reviews and the information available to answer those questions. When relevant, the questions focused on four principal outcomes of STD therapy for each individual disease: 1) microbiologic cure, 2) alleviation of signs and symptoms, 3) prevention of sequelae, and 4) prevention of transmission. Cost-effectiveness and other advantages (e.g., single-dose formulations and directly observed therapy of specific regimens) also were discussed. The consultants then assessed whether the questions identified were relevant, ranked them in order of priority, and attempted to arrive at answers using the available evidence. In addition, the consultants evaluated the quality of evidence supporting the answers on the basis of the number, type, and quality of the studies.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note from the National Guideline Clearinghouse and the Centers for Disease Control and Prevention: When more than one therapeutic regimen is recommended, the sequence is alphabetized unless the choices for therapy are prioritized based on efficacy, convenience, or cost. For sexually transmitted diseases (STDs) with more than one recommended regimen, almost all regimens have similar efficacy and similar rates of intolerance or toxicity unless otherwise specified.

Pelvic inflammatory disease (PID) comprises a spectrum of inflammatory disorders of the upper female genital tract, including any combination of endometritis, salpingitis, tubo-ovarian abscess, and pelvic peritonitis. Sexually transmitted organisms, especially *Neisseria gonorrhoeae* and *Chlamydia trachomatis*, are implicated in many cases; however, microorganisms that comprise the vaginal flora (e.g., anaerobes, *Gardnerella vaginalis, Haemophilus influenzae*, enteric Gram-negative rods, and *Streptococcus agalactiae*) also have been associated with PID. In addition, cytomegalovirus (CMV), *Mycoplasma hominis*, and *Ureaplasma urealyticum* might be the etiologic agents in some cases of PID. All women who are diagnosed with acute PID should be tested for *N. gonorrhoeae* and *C. trachomatis* and should be screened for HIV infection.

Diagnostic Considerations

Acute PID is difficult to diagnose because of the wide variation in the symptoms and signs. Many women with PID have subtle or mild symptoms. Delay in diagnosis and effective treatment probably contributes to inflammatory sequelae in the upper reproductive tract. Laparoscopy can be used to obtain a more accurate diagnosis of salpingitis and a more complete bacteriologic diagnosis. However, this diagnostic tool frequently is not readily available, and its use is not easy to justify when symptoms are mild or vague. Moreover, laparoscopy will not detect endometritis and might not detect subtle inflammation of the fallopian tubes. Consequently, a diagnosis of PID usually is based on clinical findings.

The clinical diagnosis of acute PID is imprecise. Data indicate that a clinical diagnosis of symptomatic PID has a positive predictive value (PPV) for salpingitis of 65% to 90% compared with laparoscopy. The PPV of a clinical diagnosis of acute PID depends on the epidemiologic characteristics of the population, with higher PPVs among sexually active young women (particularly adolescents), among patients attending STD clinics, or in other settings where the rates of gonorrhea or chlamydia are high. In all settings, however, no single historical, physical, or laboratory finding is both sensitive and specific for the diagnosis of acute PID (i.e., can be used both to detect all cases of PID and to exclude all women without PID). Combinations of diagnostic findings that improve either sensitivity (i.e., detect more women who have PID) or specificity (i.e., exclude more women who do not have PID) do so only at the expense of the other. For example, requiring two or more findings excludes more women who do not have PID but also reduces the number of women with PID who are identified.

Many episodes of PID go unrecognized. Although some cases are asymptomatic, others are not diagnosed because the patient or the health-care provider fails to recognize the implications of mild or nonspecific symptoms or signs (e.g., abnormal bleeding, dyspareunia, and vaginal discharge). Because of the difficulty of diagnosis and the potential for damage to the reproductive health of women, even by apparently mild or subclinical PID, health-care providers should maintain a low threshold for the diagnosis of PID.

The optimal treatment regimen and long-term outcome of early treatment of women with asymptomatic or subclinical PID are unknown. The following recommendations for diagnosing PID are intended to help health-care providers recognize when PID should be suspected and when they need to obtain additional information to increase diagnostic certainty. Diagnosis and management of other

common causes of lower abdominal pain (e.g., ectopic pregnancy, acute appendicitis, and functional pain) are unlikely to be impaired by initiating empiric antimicrobial therapy for PID.

Empiric treatment of PID should be initiated in sexually active young women and other women at risk for STDs if they are experiencing pelvic or lower abdominal pain, if no cause for the illness other than PID can be identified, and if one or more of the following minimum criteria are present on pelvic examination:

- cervical motion tenderness OR uterine tenderness OR adnexal tenderness.

The requirement that all three minimum criteria be present before the initiation of empiric treatment could result in insufficient sensitivity for the diagnosis of PID. The presence of signs of lower genital tract inflammation, in addition to one of the three minimum criteria, increases the specificity of diagnosis. In deciding upon the initiation of empiric treatment, clinicians should also consider the risk profile of the patient for STDs.

More elaborate diagnostic evaluation frequently is needed because incorrect diagnosis and management might cause unnecessary morbidity. These additional criteria may be used to enhance the specificity of the minimum criteria. The following additional criteria can be used to enhance the specificity of the minimum criteria and support a diagnosis of PID:

- oral temperature >101 degrees F (>38.3 degrees C)
- abnormal cervical or vaginal mucopurulent discharge
- presence of abundant numbers of white blood cells (WBCs) on saline microscopy of vaginal secretions
- elevated erythrocyte sedimentation rate
- elevated C-reactive protein, and
- laboratory documentation of cervical infection with *N. gonorrhoeae* or *C. trachomatis*.

The majority of women with PID have either mucopurulent cervical discharge or evidence of WBCs on a microscopic evaluation of a saline preparation of vaginal fluid. If the cervical discharge appears normal and no WBCs are observed on the wet prep of vaginal fluid, the diagnosis of PID is unlikely, and alternative causes of pain should be investigated. A wet prep of vaginal fluid offers the ability to detect the presence of concomitant infections (e.g., bacterial vaginosis and trichomoniasis).

The most specific criteria for diagnosing PID include the following:

- endometrial biopsy with histopathologic evidence of endometritis
- transvaginal sonography or magnetic resonance imaging techniques showing thickened, fluid-filled tubes with or without free pelvic fluid or tubo-ovarian complex, or Doppler studies suggesting pelvic infection (e.g., tubal hyperemia); and
- laparoscopic abnormalities consistent with PID

A diagnostic evaluation that includes some of these more extensive studies might be warranted in some cases. Endometrial biopsy is warranted in women undergoing laparoscopy who do not have visual evidence of salpingitis, as some women with PID have endometritis alone.

Treatment

PID treatment regimens must provide empiric, broad spectrum coverage of likely pathogens. Several antimicrobial regimens have been effective in achieving clinical and microbiologic cure in randomized clinical trials with short-term follow-up. However, only a limited number of investigations have assessed and compared these regimens with regard to elimination of infection in the endometrium and fallopian tubes or determined the incidence of long-term complications (e.g., tubal infertility and ectopic pregnancy) after antimicrobial regimens.

All treatment regimens should be effective against *N. gonorrhoeae* and *C. trachomatis* because negative endocervical screening for these organisms does not rule out upper reproductive tract infection. The need to eradicate anaerobes from women who have PID has not been determined definitively. Anaerobic bacteria have been isolated from the upper reproductive tract of women who have PID, and data from in vitro studies have revealed that some anaerobes (e.g., *Bacteroides fragilis*) can cause tubal and epithelial destruction. In addition, BV also is present in many women who have PID. Until treatment regimens that do not adequately cover these microbes have been demonstrated to prevent long-term sequelae (e.g., infertility and ectopic pregnancy) as successfully as the regimens that are effective against these microbes, the use of regimens with anaerobic activity should be considered. Treatment should be initiated as soon as the presumptive diagnosis has been made because prevention of long-term sequelae is dependent on immediate administration of appropriate antibiotics. When selecting a treatment regimen, health-care providers should consider availability, cost, patient acceptance, and antimicrobial susceptibility.

Some specialists have recommended that all patients with PID be hospitalized so that bed rest and supervised treatment with parenteral antibiotics can be initiated. However, in women with PID of mild or moderate clinical severity, outpatient therapy can provide short- and long-term clinical outcomes similar to inpatient therapy. Limited data support the use of outpatient therapy in women with more severe clinical presentations. The decision of whether hospitalization is necessary should be based on the discretion of the health-care provider.

The following criteria for hospitalization are suggested:

- surgical emergencies (e.g., appendicitis) cannot be excluded
- the patient is pregnant
- the patient does not respond clinically to oral antimicrobial therapy
- the patient is unable to follow or tolerate an outpatient oral regimen
- the patient has severe illness, nausea and vomiting, or high fever; and
- the patient has a tubo-ovarian abscess

Many practitioners have preferred to hospitalize adolescent women whose condition is diagnosed as acute PID. No evidence is available suggesting that

adolescents benefit from hospitalization for treatment of PID. Younger women with mild-to-moderate acute PID have similar outcomes with either outpatient therapy or inpatient therapy. Further, clinical response to outpatient treatment is similar among younger and older women. The decision to hospitalize adolescents with acute PID should be based on the same criteria used for older women. Whether women in their later reproductive years benefit from hospitalization for treatment of PID also is unclear, although women aged ≥35 years who are hospitalized with PID are more likely than younger women to have a complicated clinical course.

Parenteral Treatment

For women with PID of mild or moderate severity, parenteral and oral therapy appears to have similar clinical efficacy. Many randomized trials have demonstrated the efficacy of both parenteral and oral regimens. In the majority of clinical trials, parenteral treatment for at least 48 hours has been used after the patient has demonstrated substantial clinical improvement. Clinical experience should guide decisions regarding transition to oral therapy, which usually can be initiated within 24 hours of clinical improvement. The majority of clinicians recommend at least 24 hours of direct inpatient observation for patients who have tubo-ovarian abscesses.

Recommended Parenteral Regimen A

- **Cefotetan** 2 g intravenously (IV) every 12 hours

  OR

- **Cefoxitin** 2 g IV every 6 hours

  PLUS

- **Doxycycline** 100 mg orally or IV every 12 hours

Note: Because of the pain associated with infusion, doxycycline should be administered orally when possible, even when the patient is hospitalized. Oral and IV administration of doxycycline provide similar bioavailability.

Parenteral therapy may be discontinued 24 hours after a patient improves clinically, and oral therapy with doxycycline (100 mg twice a day) should continue to complete 14 days of therapy. When tubo-ovarian abscess is present, many health-care providers use clindamycin or metronidazole with doxycycline for continued therapy, rather than doxycycline alone, because it provides more effective anaerobic coverage.

Clinical data are limited regarding the use of other second- or third-generation cephalosporins (e.g., ceftizoxime, cefotaxime, and ceftriaxone), which also might be effective therapy for PID and may replace cefotetan or cefoxitin. However, these cephalosporins are less active than cefotetan or cefoxitin against anaerobic bacteria.

Recommended Parenteral Regimen B

- **Clindamycin** 900 mg IV every 8 hours

  PLUS

- **Gentamicin** loading dose IV or IM (2 mg/kg of body weight), followed by a maintenance dose (1.5 mg/kg) every 8 hours. Single daily dosing may be substituted.

Although use of a single daily dose of gentamicin has not been evaluated for the treatment of PID, it is efficacious in analogous situations. Parenteral therapy can be discontinued 24 hours after a patient improves clinically; continuing oral therapy should consist of doxycycline 100 mg orally twice a day or clindamycin 450 mg orally four times a day to complete a total of 14 days of therapy. When tubo-ovarian abscess is present, many health-care providers use clindamycin for continued therapy, rather than doxycycline, because clindamycin provides more effective anaerobic coverage.

Alternative Parenteral Regimens

Limited data support the use of other parenteral regimens, but the following three regimens have been investigated in at least one clinical trial, and they have broad spectrum coverage.

- **Levofloxacin** 500 mg IV once daily*

  WITH OR WITHOUT

- **Metronidazole** 500 mg IV every 8 hours

  OR

- **Ofloxacin** 400 mg IV every 12 hours*

  WITH OR WITHOUT

- **Metronidazole** 500 mg IV every 8 hours

  OR

- **Ampicillin/Sulbactam** 3 g IV every 6 hours

  PLUS

- **Doxycycline** 100 mg orally or IV every 12 hours

*Quinolones should not be used in persons with a history of recent foreign travel or partners' travel, infections acquired in California or Hawaii, or infections acquired in other areas with increased quinolone-resistant *Neisseria gonorrhoeae* (QRNG) prevalence.

IV ofloxacin has been investigated as a single agent; however, because of concerns regarding its spectrum, metronidazole may be included in the regimen. Levofloxacin is as effective as ofloxacin and may be substituted; its single daily dosing makes it advantageous from a compliance perspective. One trial demonstrated high short-term clinical cure rates with azithromycin, either alone for 1 week (at least one IV dose followed by oral therapy) or with a 12-day course of metronidazole. Ampicillin/sulbactam plus doxycycline is effective coverage against *C. trachomatis, N. gonorrhoeae*, and anaerobes and for patients who have tubo-ovarian abscess.

Oral Treatment

Oral therapy can be considered for women with mild-to-moderately severe acute PID, as the clinical outcomes among women treated with oral therapy are similar to those treated with parenteral therapy. The following regimens provide coverage against the frequent etiologic agents of PID. Patients who do not respond to oral therapy within 72 hours should be reevaluated to confirm the diagnosis and should be administered parenteral therapy on either an outpatient or inpatient basis.

Recommended Regimen A

- **Levofloxacin** 500 mg orally once daily for 14 days*

  OR

- **Ofloxacin** 400 mg orally twice daily for 14 days

  WITH OR WITHOUT

- **Metronidazole** 500 mg orally twice a day for 14 days

*Quinolones should not be used in persons with a history of recent foreign travel or partners' travel, infections acquired in California or Hawaii, or infections acquired in other areas with increased QRNG prevalence.

Oral ofloxacin has been investigated as a single agent in two clinical trials, and it is effective against both *N. gonorrhoeae* and *C. trachomatis*. Despite the results of these trials, lack of anaerobic coverage with ofloxacin is a concern; the addition of metronidazole to the treatment regimen provides this coverage. Levofloxacin is as effective as ofloxacin and may be substituted. Azithromycin has been demonstrated in one randomized trial to be an effective regimen for acute PID. The addition of metronidazole should be considered, as anaerobic organisms are suspected in the etiology of the majority of PID cases. Metronidazole will also treat BV, which frequently is associated with PID.

Regimen B

- **Ceftriaxone** 250 mg intramuscularly (IM) in a single dose

  PLUS

- **Doxycycline** 100 mg orally twice a day for 14 days

  WITH or WITHOUT

- **Metronidazole** 500 mg orally twice a day for 14 days

  OR

- **Cefoxitin** 2 g IM in a single dose and **Probenecid**, 1 g orally administered concurrently in a single dose

  PLUS

- **Doxycycline** 100 mg orally twice a day for 14 days

  WITH or WITHOUT

- **Metronidazole** 500 mg orally twice a day for 14 days

  OR

- Other parenteral third-generation **cephalosporin** (e.g., **ceftizoxime** or **cefotaxime**)

  PLUS

- **Doxycycline** 100 mg orally twice a day for 14 days

  WITH or WITHOUT

- **Metronidazole** 500 mg orally twice a day for 14 days

The optimal choice of a cephalosporin for Regimen B is unclear; although cefoxitin has better anaerobic coverage, ceftriaxone has better coverage against *N. gonorrhoeae*. Clinical trials have demonstrated that a single dose of cefoxitin is effective in obtaining short-term clinical response in women who have PID. However, the theoretical limitations in cefoxitin's coverage of anaerobes might require the addition of metronidazole to the treatment regimen). Metronidazole also will effectively treat BV, which is frequently associated with PID. No data have been published regarding the use of oral cephalosporins for the treatment of PID. Limited data suggest that the combination of oral metronidazole and doxycycline after primary parenteral therapy is safe and effective.

Alternative Oral Regimens

Although information regarding other outpatient regimens is limited, one other regimen has undergone at least one clinical trial and has broad spectrum coverage. Amoxicillin/clavulanic acid and doxycycline was effective in obtaining short-term clinical response in a single clinical trial; however, gastrointestinal symptoms might limit compliance with this regimen.

Follow-Up

Patients should demonstrate substantial clinical improvement (e.g., defervescence; reduction in direct or rebound abdominal tenderness; and reduction in uterine, adnexal, and cervical motion tenderness) within 3 days after initiation of therapy. Patients who do not improve within this period usually require hospitalization, additional diagnostic tests, and surgical intervention.

If no clinical improvement has occurred within 72 hours after outpatient oral or parenteral therapy (using the criteria for clinical improvement described previously), an examination should be performed. Subsequent hospitalization, parenteral therapy, and diagnostic evaluation, including the consideration of diagnostic laparoscopy for alternative diagnoses, are recommended in women without clinical improvement. Some specialists also recommend rescreening for *C. trachomatis* and *N. gonorrhoeae* 4-6 weeks after therapy is completed in women with documented infection with these pathogens. All women diagnosed with acute PID should be offered HIV testing.

Management of Sex Partners

Male sex partners of women with PID should be examined and treated if they had sexual contact with the patient during the 60 days preceding the patient's onset of symptoms. Evaluation and treatment are imperative because of the risk for reinfection of the patient and the strong likelihood of urethral gonococcal or chlamydial infection in the sex partner. Male partners of women who have PID caused by *C. trachomatis* and/or *N. gonorrhoeae* frequently are asymptomatic.

Sex partners should be treated empirically with regimens effective against both of these infections, regardless of the etiology of PID or pathogens isolated from the infected woman. Even in clinical settings in which only women are treated, arrangements should be made to provide care for male sex partners of women who have PID. When providing care for male sex partners is not feasible, health-care providers should ensure that sex partners are referred for appropriate treatment.

Prevention

Prevention of chlamydial infection by screening and treating high-risk women reduces the incidence of PID. Theoretically, the majority of cases of PID can be prevented by screening all women or those determined to be at high risk (based on age or other factors) by using DNA amplification on cervical specimens (in women receiving pelvic examinations) and on urine specimens (in women not undergoing examinations). Although bacterial vaginosis is associated with PID, whether the incidence of PID can be reduced by identifying and treating women with BV is unclear.

Special Considerations

Pregnancy

Because of the high risk for maternal morbidity and preterm delivery, pregnant women who have suspected PID should be hospitalized and treated with parenteral antibiotics.

HIV Infection

Differences in the clinical manifestations of PID between HIV-infected women and HIV-negative women have not been well-delineated. In previous observational studies, HIV-infected women with PID were more likely to require surgical intervention. More comprehensive observational and controlled studies (published since the 2002 STD Treatment Guidelines) have demonstrated that HIV-infected women with PID had similar symptoms when compared with uninfected controls. They were more likely to have a tubo-ovarian abscess but responded equally well to standard parenteral and oral antibiotic regimens when compared with HIV-negative women. The microbiologic findings for HIV-positive and HIV-negative women were similar, except HIV-infected women had higher rates of concomitant *M. hominis*, candida, streptococcal, and HPV infections and HPV-related cytologic abnormalities. Whether the management of immunodeficient HIV-infected women with PID requires more aggressive interventions (e.g., hospitalization or parenteral antimicrobial regimens) has not been determined.

IUD

Intrauterine contraceptive devices (IUDs) are becoming a popular contraceptive choice for women. Both levonorgestrel- and copper-containing devices are marketed in the United States. The risk of PID associated with IUD use is primarily confined to the first 3 weeks after insertion and is uncommon thereafter. Given the popularity of IUDs, practitioners might encounter PID in IUD users. No evidence suggests that IUDs should be removed in women diagnosed with acute PID. However, caution should be exercised if the IUD remains in place, and close clinical follow-up is mandatory. The rate of treatment failure and recurrent PID in women continuing to use an IUD is unknown. No data exist on antibiotic selection and treatment outcomes according to type of IUD (e.g., copper or levonorgestrel).

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

Throughout the 2006 guideline document, the evidence used as the basis for specific recommendations is discussed briefly. More comprehensive, annotated discussions of such evidence will appear in background papers that will be published in a supplement issue of the journal *Clinical Infectious Diseases*.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Improved accurate diagnosis of pelvic inflammatory disease (PID)
- Reduction in damage to reproductive health of women by PID (e.g., tubal infertility, ectopic pregnancy)
- Prevention of transmission of gonococcal or chlamydial infections to sex partners
- Prevention of maternal morbidity and preterm delivery in pregnant women with PID

Subgroups Most Likely to Benefit

- Pregnant women
- Women with PID who wish to become pregnant in the future

POTENTIAL HARMS

- Doxycycline is associated with pain during infusion
- Amoxicillin/clavulanic acid plus doxycycline can cause gastrointestinal symptoms
- The rate of treatment failure and recurrent pelvic inflammatory disease (PID) in women continuing to use an intrauterine contraceptive device (IUD) is unknown.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- These recommendations were developed in consultation with public- and private-sector professionals knowledgeable in the treatment of patients with sexually transmitted diseases (STDs). The recommendations are applicable to various patient-care settings, including family planning clinics, private physicians' offices, managed care organizations, and other primary-care facilities.
- These recommendations are meant to serve as a source of clinical guidance: health-care providers should always consider the individual clinical circumstances of each person in the context of local disease prevalence. These guidelines focus on the treatment and counseling of individual patients and do not address other community services and interventions that are important in STD/human immunodeficiency virus (HIV) prevention.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Centers for Disease Control and Prevention, Workowski KA, Berman SM. Pelvic inflammatory disease. Sexually transmitted diseases treatment guidelines 2006 [published errata appear in MMWR Morb Mortal Wkly Rep 2006 Sep 15;55(36):997]. MMWR Morb Mortal Wkly Rep 2006 Aug 4;55(RR-11):56-61. [222 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1993 (revised 2006 Aug 4)

GUIDELINE DEVELOPER(S)

Centers for Disease Control and Prevention - Federal Government Agency [U.S.]

GUIDELINE DEVELOPER COMMENT

These guidelines for the treatment of persons who have sexually transmitted diseases (STDs) were developed by CDC after consultation with a group of professionals knowledgeable in the field of STDs who met in Atlanta, Georgia, during April 19–21, 2005.

SOURCE(S) OF FUNDING

United States Government

GUIDELINE COMMITTEE

Not stated

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Chairpersons: David Atkins, MD, Agency for Healthcare Research and Quality, Rockville, Maryland; Kimberly A. Workowski, MD, National Center for HIV, STD, and TB Prevention, CDC, and Emory University, Atlanta, GA

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Centers for Disease Control and Prevention. Pelvic inflammatory disease. Sexually transmitted diseases treatment guidelines. MMWR Recomm Rep 2002 May 10;51(RR-6):48-52.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Centers for Disease Control and Prevention (CDC) Web site:

- HTML Format
- Portable Document Format (PDF)

Print copies: Available from the Centers for Disease Control and Prevention, MMWR, Atlanta, GA 30333. Additional copies can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325; (202) 783-3238.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Workowski KA, Levine WC, Wasserheit JN. U.S. Centers for Disease Control and Prevention guidelines for the treatment of sexually transmitted diseases: an opportunity to unify clinical and public health practice. Ann Intern Med. 2002 Aug 20;137(4):255-62. Electronic copies: Available through Annals of Internal Medicine Online.

- The CDC Sexually Transmitted Diseases Treatment Guidelines 2004 for PDA or Palm OS. Available from the CDC National Prevention Information Network (NPIN) Web site.

PATIENT RESOURCES

None available

NGC STATUS

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